

AD-A114 371

OCEAN DATA SYSTEMS INC ROCKVILLE MD
COMPUTER SUPPORT TO NORDA CODES 520 AND 530. (U)
APR 82

F/G 9/2

N00014-77-C-0165

UNCLASSIFIED

NL

1 OF 1
AD-A
11-6-87

END
DATE
FILMED
05-82
DTIC

12



MAIL

FILE COPY

DTIC
SELECTE
MAY 13 1982
S H D



DISTRIBUTION STATEMENT A
Approved for public release
Distribution Unlimited

82 04 23 009

(12)

odsi OCEAN DATA SYSTEMS, INC.
6000 EXECUTIVE BLVD., ROCKVILLE, MARYLAND 20852 • 301/881-3031

Submitted To:
OFFICE OF NAVAL RESEARCH
Washington, D.C.

COMPUTER SUPPORT
TO NORDA CODES 520 AND 530

Final Contract Report

20 April 1982

Prepared Under
Contract N00014-77-0165

Prepared By:
OCEAN DATA SYSTEMS, INC.
6000 Executive Boulevard
Rockville, MD 20852

DTIC
ELECTE
MAY 13 1982
S D
H

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution (U) unlimited

FOREWORD

This document is a Final Contract Report prepared under Contract N00014-77-C-0165 for the Office of Naval Research, Washington, D.C., in support of the Naval Ocean Research and Development Activity (NORDA), Code 520, NSTL Station, Mississippi. The report indicates the documents generated in the course of this effort, which was sponsored by NORDA 520 and was directed to providing computer systems technical support to NORDA 520 and 530.

Ocean Data Systems is indebted to CDR Michael McCallister of NORDA 520 and his predecessor, CDR Kirk Evans, for furnishing an environment conducive to the completion of this contract effort. The successful realization of contract objectives was in large part due to their managerial and technical guidance.



Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification <i>for</i>	
<i>FK-182 on file</i>	
By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
<i>A</i>	

ABSTRACT

From the start of this contract in 1977 to the date of this document, ODSI prepared 13 reports as the result of various computer systems related task efforts sponsored by NORDA 520 in support of NORDA 520 and 530 acoustics and environmental modelling activities. This document, as the Final Contract Report, contains the title page, foreword, abstract and table of contents for each of those 13 reports. These reports, in their entirety, are available upon request from ODSI.

TABLE OF CONTENTS

	<u>PAGE</u>
FOREWORD	i
ABSTRACT	ii
TABLE OF CONTENTS	iii
SHARPS III TESTING	1
SHARPS III TEST & EVALUATION SUPPORT	7
MULTIPLE PROFILE RAY TRACE PLOT PROGRAM	13
FANM/SIAM NOISE PLOT PROGRAM	18
NORDA MODEL OPERATING SYSTEM Functional Description & FY-80 Implementation Plan . .	23
CONVRT: CREATABASE/RSVP DATA FILE SOFTWARE INTERFACE	30
SOFTWARE DESIGN, CONFIGURATION AND DOCUMENTATION REVIEW.	37
NORDA ACOUSTIC MODEL OPERATION SYSTEM (NAMOS) User's Primer - Version 1.0	43
NORDA ACOUSTIC MODEL OPERATING SYSTEM (NAMOS) System Summary FY-80 Technical Task Report	50
NORDA ACOUSTIC MODEL OPERATING SYSTEM (NAMOS) Programmer's Reference Manual	57
NORDA ACOUSTIC MODEL OPERATING SYSTEM (NAMOS) Final Technical Task Report - Version 2.0.	65
FACT-9H VERSION DESCRIPTION DOCUMENT	71
NORDA ACOUSTIC MODEL OPERATING SYSTEM (NAMOS) User's Primer - Version 2.3	76



OCEAN DATA SYSTEMS, INC.

6000 EXECUTIVE BLVD., ROCKVILLE, MARYLAND 20852 • 301/881-3031

Submitted To:
OFFICE OF NAVAL RESEARCH
WASHINGTON, D. C.

SHARPS III TESTING

Task Report

October 21, 1977

Prepared Under:
Contract No. N00014-77-C-0165

Prepared By:
E. W. Ver Hoef
OCEAN DATA SYSTEMS, INC.
ROCKVILLE, MD 20852

FOREWORD

This document is a task report prepared under Contract No. N00014-77-C-0165 for the Office of Naval Research, Washington, D. C., in support of the Long Range Acoustic Propagation Project (LRAPP), Naval Ocean Research and Development Activity - Code 600, Bay St. Louis, Mississippi. Ocean Data Systems, Inc. is indebted to CDR. James E. Paquin, LRAPP for his support of this work, to Mr. W.D. Kirby, Bolt, Beranek and Newman, Inc. for his technical guidance, and to Lt. Norine Prochaska, Fleet Numerical Weather Central for her assistance in installation and testing.

ABSTRACT

This report summarizes changes made to the SHARPS III (Ship-Helicopter Acoustic Range Prediction System) model during the testing phase of the model which took place in the period from March 15, 1977 to June 15, 1977. It discusses the changes made and demonstrates the cumulative effects thereof by means of forecasts produced before and after application of the changes.

TABLE OF CONTENTS

<u>SECTION</u>		<u>PAGE</u>
	FOREWORD	i
	ABSTRACT.	ii
	TABLE OF CONTENTS	iii
	LIST OF FIGURES.	iv
I	INTRODUCTION	I-1
II	CHANGES TO THE MODEL	II-1
	A. Subroutine CZRNG	II-1
	B. Subroutine EIGEN.	II-1
	C. Subroutine FRAMOS.	II-2
	D. Subroutine FRQNCY.	II-2
	E. Subroutine NM2.	II-2
	F. Subroutine NOISE	II-3
	G. Subroutine RANGER.	II-3
	H. Subroutine REVERB	II-4
	I. Subroutine RTRACE.	II-4
	J. Subroutine SETTOW	II-4
	K. Subroutine SEXY	II-5
	L. Subroutine SHAPE.	II-6
	M. Subroutine SLFNOYS	II-6
III	EFFECT OF CHANGES	III-1

LIST OF FIGURES

<u>FIGURE</u>		<u>PAGE</u>
III-1	Environment Data.	III-2
III-2	SHARPS III Forecasts Before Program Changes	III-9
III-3	SHARPS III Forecasts After Program Changes.	III-15



OCEAN DATA SYSTEMS, INC.

6000 EXECUTIVE BLVD., ROCKVILLE, MARYLAND 20852 • 301/881-3031

Submitted To:
OFFICE OF NAVAL RESEARCH
WASHINGTON, D. C.

SHARPS III TEST AND
EVALUATION SUPPORT

Task Report

November 17, 1977

Prepared Under
Contract No. N00014-77-C-0165

Prepared By:
E. W. Ver Hoef
OCEAN DATA SYSTEMS, INC.
ROCKVILLE, MARYLAND 20852

FOREWORD

This document is a task report prepared under Contract No. N00014-77-C-0165 for the Office of Naval Research, Washington, D. C., in support of the Long Range Acoustic Propagation Project (LRAPP), Naval Ocean Research and Development Activity (NORDA) - Code 600, Bay St. Louis, Mississippi. Ocean Data Systems, Inc. is indebted to CDR. James E. Paquin, LRAPP for his support of this work, to Mr. W.D. Kirby, Bolt, Beranek and Newman, Inc. for his guidance and to Lt. Norine Prochaska, FNWC for her assistance in installation and testing.

ABSTRACT

This report summarizes changes made to the SHARPS III (Ship-Helicopter Acoustic Range Prediction System) model in preparation for the test and evaluation phase of the model. These changes were made and tested during the period from mid-June, 1977 to mid-October, 1977 at which time they were incorporated into the version of the model installed at Fleet Numerical Weather Central. The report discusses the changes and demonstrates their cumulative effect by means of forecasts produced before and after application of the changes.

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
FOREWORD	i
ABSTRACT	ii
TABLE OF CONTENTS	iii
LIST OF FIGURES	iv
I. INTRODUCTION	I-1
II. CHANGES TO THE MODEL	II-1
A. Program SHARP3	II-1
B. Subroutine ATEN	II-1
C. Subroutine CONJDP	II-1
D. Subroutine CZMIN	II-1
E. Subroutine EIGEN	II-2
F. Subroutine ENVIN	II-2
G. Subroutine FITVEL	II-3
H. Subroutine FRQNCY	II-3
I. Subroutine GRADE	II-3
J. Subroutine LEROY	II-3
K. Subroutine MSGLINE	II-4
L. Subroutine MSGPRT	II-4
M. Subroutine NM2	II-4
N. Subroutine PREAM	II-4
O. Subroutine PROFILE	II-4
P. Subroutine RANGER	II-5
Q. Subroutine RAY	II-5
R. Subroutine RETREVE	II-5
S. Subroutine REVERB	II-5
T. Subroutine RTRACE	II-5
U. Subroutine SAVE	II-6
V. Subroutine SETDIP	II-6
W. Subroutine SETTOW	II-6
X. Subroutine SHAPE	II-6
Y. Subroutine SNOYSVD	II-6
Z. Subroutine SONIN	II-6
AA. Subroutine STDEPTH	II-7
BB. Subroutine STZSCAT	II-7
CC. Subroutine SURLOS	II-7
DD. Subroutine TITLE	II-7
EE. Subroutine TITLINE	II-8
FF. Subroutine VELCOMP	II-8
III. EFFECT OF CHANGES	III-1

LIST OF FIGURES

<u>FIGURE</u>		<u>PAGE</u>
III-1	Environmental Data	III-2
III-2	SHARPS III Forecasts Before Program Changes	III-9
III-3	SHARPS III Forecasts After Program Changes	III-16



OCEAN DATA SYSTEMS, INC.

6000 EXECUTIVE BLVD., ROCKVILLE, MARYLAND 20852 • 301/881-3031

Submitted To:

OFFICE OF NAVAL RESEARCH
WASHINGTON, D.C.

MULTIPLE PROFILE RAY
TRACE PLOT PROGRAM

Technical Task Report

January 10, 1979

Prepared Under

Contract N00014-77-C-0165

Prepared By:

D. Long

OCEAN DATA SYSTEMS, INC.
ROCKVILLE, MARYLAND 20852

FOREWORD

This document is a Technical Task Report prepared under Contract N00014-77-C-0165 for the Office of Naval Research, Washington, D.C., in support of the Naval Ocean Research and Development Activity (NORDA) -Code 321, Bay St. Louis, Miss. The report summarizes the work performed in fulfilling contract objectives and serves as the documentation of a computer program that generates plots of ray trace data computed by the second part of the five part Multiple Profile Program.

Ocean Data Systems, Inc. is indebted to Dr. Aubrey Anderson and his staff at NORDA 321 for furnishing the environment conducive to the successful realization of the objectives of this contract.

ABSTRACT

The Ray Plot Program (RPLLOT) generates ray trace plots from ray trajectory data computed by the second part of the five-part Multiple Profile Program. With the selection by the user of the appropriate auxiliary system software, ray plots may be produced on the CALCOMP, HOUSTON, VARIAN or ZETA plotters. This report presents documentation of the RPLLOT program including detailed subroutine descriptions, input and output formats and sample run decks for execution of RPLLOT at the Eglin AFB, Florida and Carderock, Maryland CDC-6000 computer facilities.

TABLE OF CONTENTS

<u>SECTION</u>		<u>PAGE</u>
	FOREWORD	i
	ABSTRACT	ii
	TABLE OF CONTENTS	iii
I	INTRODUCTION	I-1
II	INPUT	II-1
	1. Mass Storage	II-1
	2. Card Input	II-3
III	OUTPUT	III-1
	1. Mass Storage Output	III-1
	2. Printed Output	III-1
	3. Plotted Output	III-1
IV	PROGRAM DESCRIPTION	IV-1
	1. Program RPLOT	IV-1
	2. Subroutine PTCK	IV-17
	3. Subroutine DASHL	IV-24
V	USER'S GUIDE	V-1
	1. Permanent File Identification	V-1
	2. Sample Run Decks	V-3



OCEAN DATA SYSTEMS, INC.

6000 EXECUTIVE BLVD., ROCKVILLE MARYLAND 20852 • 301/881-3031

Submitted To:

OFFICE OF NAVAL RESEARCH
WASHINGTON, D.C.

FANM/SIAM NOISE PLOT PROGRAM

Technical Task Report

July 13, 1979

Prepared Under
Contract N00014-77-C-0165

Prepared By:

D. Long
OCEAN DATA SYSTEMS, INC.
ROCKVILLE, MARYLAND 20852

FOREWORD

This document is a Technical Task Report prepared under Contract N00014-77-C-0165 for the Office of Naval Research, Washington, D.C., in support of the Naval Ocean Research and Development Activity (NORDA) -- Code 321, NSTL Station, Mississippi. The report summarizes the work performed in fulfilling contract objectives and serves as the documentation of a computer program that provides the capability to plot the ambient noise data generated by the FANM and SIAM computer models.

Ocean Data Systems, Inc., is indebted to LCDR K. Evans, NORDA Code 600, for furnishing the environment conducive to the successful realization of the objectives of this contract. Special thanks is due to J. Cornyn and LTJG B. Northridge, both of NORDA Code 321, for providing helpful suggestions concerning program and output specifications.

ABSTRACT

The FANM computer program computes the horizontal and vertical components of the ambient noise at a user specified location while the SIAM program computes horizontal noise values only. As the use of these two programs became more widespread and frequent, it became necessary to provide a better means for the visual qualitative evaluation of program output than that provided by the tabular listing of computed values.

This report presents the documentation of the FANM/SIAM ambient noise plot program whose objective is to permit the plotting, on a variety of plot hardware, of FANM or SIAM generated ambient noise values in an efficient and uncomplicated manner and with a minimal amount of user interaction. In addition to FORTRAN program documentation, this report presents sample output and sample execution decks for the use of this program at the Eglin and David Taylor Naval Ship Research and Development Center (DTNSRDC) computer facilities.

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
FOREWORD	i
ABSTRACT	ii
TABLE OF CONTENTS	iii
I. INTRODUCTION	I-1
II. INPUT.	II-1
1. Mass Storage Input	II-1
1. FANM File Format	II-1
2. SIAM File Format	II-3
3. File Attaching	II-5
2. Card Input	II-6
III. OUTPUT.	III-1
1. Plotter Output	III-1
2. Printed Output	III-1
IV. PROGRAM DESCRIPTION	IV-1
1. Main Program	IV-1
2. Subroutine COUNT	IV-12
3. Subroutine ENCLOS	IV-14
4. Subroutine FANMIN	IV-17
5. Subroutine GDRAW	IV-23
6. Subroutine INTERP	IV-32
7. Subroutine PLOTBL	IV-35
8. Subroutine SIAMIN	IV-45
V. SUBROUTINE CROSS REFERENCE	V-1
VI. COMMON CROSS REFERENCE.	VI-1
VII. USER'S GUIDE	VII-1
1. Permanent File Identification.	VII-1
2. Sample Execution Decks	VII-2



OCEAN DATA SYSTEMS, INC.

6000 EXECUTIVE BLVD., ROCKVILLE, MARYLAND 20852 • 301/881-3031

Prepared for
Naval Ocean Research and Development Activity
NSTL Station, Mississippi

Prepared under
Contract No. N00014-77-C-0165

NORDA
MODEL OPERATING SYSTEM

Functional Description
and
FY-80 Implementation Plan

(PRELIMINARY DRAFT)

February 5, 1980

Prepared by
John H. Locklin
Jacqueline Webster
OCEAN DATA SYSTEMS, INC.
Rockville, Maryland

ABSTRACT

The Naval Ocean Research and Development Activity (NORDA) Model Operating System (MOS) is a large computer software system designed to predict environmental factors which affect the performance of underwater acoustic sensors and estimate resulting sensor and sensor system performance. MOS draws together existing modeling capabilities into a more cohesive entity, provides a framework for the systematic evolution of those capabilities and constitutes a significant upgrade in the current NORDA 320 modeling capabilities. MOS is responsive to NORDA 320's operating requirements and is designed to facilitate the conduct of research and development, and studies requiring the production of sonar system performance estimates.

This document is a Function Description of the MOS. Since the MOS makes substantial use of existing NORDA 320 modeling technology, this document concentrates on the formal definition of modularized acoustic modeling functions and the overall architecture of the software system which performs those functions. This document provides a relatively detailed discussion of the MOS, emphasizing the characteristics of a comprehensive system and establishing overall design objective and principles to be used in the FY-80 implementation of a pilot MOS.

FOREWORD

This document is a function description document which discusses the Naval Ocean Research and Development Activity (NORDA) Model Operating System (MOS), a large automated software system responsive to the operating requirements of NORDA 320. It is an interim technical task report for the functional description task completed under Contract Number N00014-77-C-0165. This work was performed by Ocean Data Systems, Inc. (ODSI) for NORDA, NSTL Station, Mississippi. Specific contract technical direction was provided by NORDA Code 500, the Ocean Programs Office, and NORDA Code 320, the Numerical Modeling Division.

Ocean Data Systems, Inc., acknowledges Mr. John Cornyn, NORDA Code 321, for his technical management support in the formulation of the guiding principles and concepts to be used in the MOS. Dr. Ed Moses, Operations Research, Inc., is thanked for his very substantial contributions regarding the definition of the acoustic modeling functions which serves as the acoustic foundation for the MOS. The efforts of Dr. Marv Weinstein and Mr. Lou Mole, Underwater Systems, Inc., and Dr. Jim Davis, NORDA 321, have provided valuable consultation assistance and are greatly appreciated.

Finally, Ocean Data Systems, Inc., is indebted to LCDR Kirk Evans, Acoustic Modeling Program Manager, Surveillance Environmental Acoustic Support (SEAS) Project, NORDA Code 520, for his enthusiastic sponsorship of this work.

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
ABSTRACT	i
FOREWORD	ii
TABLE OF CONTENTS	iii
1.0 GENERAL INFORMATION	1-1
1.1 Purpose of the Functional Description	1-1
1.2 Document Approach and Scope	1-2
1.3 Project References	1-3
2.0 MODEL OPERATING SYSTEM SUMMARY	2-1
2.1 Background	2-1
2.2 Objectives	2-2
2.3 Existing Capabilities	2-3
2.4 Proposed Capabilities	2-5
2.5 Summary of Impacts	2-8
2.5.1 Equipment Impacts	2-8
2.5.2 Software Impacts	2-9
2.6 Assumptions and Limitations	2-10
3.0 DETAILED CHARACTERISTICS	3-1
3.1 General Design Considerations	3-1
3.2 General System Structure and Organization.	3-4
3.2.1 Environments.	3-4
3.2.1.1 Modeling Environment	3-5
3.2.1.2 Computing Environment	3-6
3.2.2 Acoustic Modeling Process Flow	3-8
3.2.3 System Structure and Computing Environments	3-11
3.3 Application Functions Inputs and Outputs.	3-15
3.3.1 Signal Level (SL)	3-17
3.3.2 Sonar System Characteristics (SC).	3-19
3.3.3 Beam Pattern (BP)	3-21
3.3.4 Noise Sources (N)	3-24
3.3.5 Ocean Environment (OE)	3-27
3.3.6 Transmission Loss (TL).	3-31
3.3.7 Ambient Noise (AN)	3-34
3.3.8 Self Noise (SN)	3-36
3.3.9 Beam Noise (BN)	3-39
3.3.10 Beam Signal (BS)	3-45
3.3.11 Sonar Performance (SP)	3-50

TABLE OF CONTENTS

<u>SECTION</u>		<u>PAGE</u>
3.4	System Software Functions	3-52
3.4.1	Executive Functions	3-54
3.4.1.1	The Executive	3-54
3.4.1.2	Executive Control Utilities	3-55
3.4.2	Processor Functions	3-57
3.4.3	Interactive Application Functions	3-59
3.5	Data Base/Data File Characteristics	3-60
3.6	System Maintenance and Documentation	3-64
4.0	FY-80 DESIGN DETAILS	
4.1	General FY-80 Design Considerations	
4.2	Application Process Flow	
4.3	System Process Flow	
4.4	Program/Data File Summary Descriptions	
4.4.1	Existing Software and Data Files	
4.4.2	New Software and Data Files	
5.0	FY-80 IMPLEMENTATION PLAN	
5.1	Task Summary	
5.2	Task Descriptions	
5.3	Schedule	
6.0	SUMMARY AND EXTENDED CONCEPTS	
APPENDIX A:	Existing Software and Data Bases	A-1
APPENDIX B:	Display/Output/Graphical (DG) Candidate Outputs	B-1
APPENDIX C:	Notation	C-1
APPENDIX D:	Parameter Limits and Resolution	D-1
APPENDIX E:	System Maintenance (proposed)	E-1
APPENDIX F:	System Documentation (proposed)	F-1

LIST OF FIGURES

<u>FIGURE</u>		<u>PAGE</u>
3-1	COMPUTING ENVIRONMENT	3-7
3-2	ACOUSTIC MODELING DATA FLOW CONCEPT (MOS APPLICATION FUNCTIONS)	3-9
3-3	MOS STRUCTURE AND ORGANIZATION	3-12
3-4	SIGNAL LEVEL (SL).	3-18
3-5	SONAR SYSTEM CHARACTERISTICS (SC).	3-20
3-6	BEAM PATTERN (BP)	3-23
3-7	NOISE SOURCES (N)	3-26
3-8	OCEAN ENVIRONMENT (OE).	3-30
3-9	TRANSMISSION LOSS (TL)	3-33
3-10	AMBIENT NOISE (AN)	3-35
3-11	SELF NOISE (SN)	3-38
3-12	BEAM NOISE (BN)	3-41
3-13	BEAM NOISE OPTION 1 (BN1)	3-42
3-14	BEAM NOISE OPTION 2 (BN2)	3-43
3-15	BEAM NOISE OPTION 3 (BN3)	3-44
3-16	BEAM SIGNAL (BS)	3-47
3-17	BEAM SIGNAL OPTION 1 (BS1)	3-48
3-18	BEAM SIGNAL OPTION 2 (BS2)	3-49
3-19	SONAR PERFORMANCE (SP)	3-51
3-20	MOS SYSTEM SOFTWARE STRUCTURE AND ORGANIZATION.	3-53

odsi OCEAN DATA SYSTEMS, INC.
6000 EXECUTIVE BLVD., ROCKVILLE, MARYLAND 20852 • 301/881-3031

Prepared for
Naval Ocean Research and Development Activity
NSTL Station, Mississippi

Prepared under
Contract No. N00014-77-C-0165

CONVRT:
CREATABASE/RSVP DATA FILE
SOFTWARE INTERFACE
Technical Task Report
July 29, 1980

Prepared by:
Dr. R. L. Hall
J. H. Locklin
OCEAN DATA SYSTEMS, INC.
ROCKVILLE, MARYLAND 20852

FOREWORD

This document is a Technical Task Report prepared under Contract Number N00014-77-C-0165 for the Naval Ocean Research and Development Activity (NORDA), NSTL Station, Mississippi. It is the user and technical documentation for the computer program CONVRT developed to interface the CREATABASE generated Subset Binary File with the programs RSVP and RETVAL. Specifically, this work was performed for NORDA Code 520, the Surveillance Environmental Acoustic Support (SEAS) Project.

Ocean Data Systems is indebted to LCDR Kirk Evans, NORDA Code 520, for furnishing an environment conducive to completion of this task.

ABSTRACT

CONVRT is a computer program which provides the capability to interface oceanographic hydrocast data contained in the SEAS Data Bank with the programs RSVP and RETVAL which are used to select and preprocess ocean station data for use by the NORDA suite of acoustic models. CONVRT is a stand-alone program which generates a packed RSVP input data file from a Subset Binary File produced by CREATABASE, the Data Bank storage and retrieval system. This data file reformatting is accomplished in an efficient and uncomplicated manner with a minimal amount of user interaction.

This document is the complete technical and user documentation for CONVRT. It presents a discussion of the software design and implementation and the source level documentation for all components of the program. It also describes the input and output files in detail as well as instructions to the user for the preparation of the input file and the execution of the program.

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
FOREWORD	i
ABSTRACT	ii
TABLE OF CONTENTS	iii
LIST OF FIGURES	v
I. INTRODUCTION	I-1
1. Background	I-1
2. Scope	I-2
3. Objective	I-3
4. Project References	I-4
II. GENERAL DESCRIPTION	II-1
1. Functional Overview	II-1
2. Usage	II-6
1. Inputs	II-7
2. Output	II-10
III. PROGRAM DESCRIPTION	III-1
1. CONVRT Program Organization	III-1
2. Main Program	III-4
3. Subroutine CTLCRD	III-6
4. Subroutine DETAIL	III-8
5. Subroutine MASTER	III-11
6. Subroutine MOVE	III-15
7. Subroutine MVSHRT	III-18
8. Subroutine OUTBUF	III-20
9. Subroutine OUTOPN	III-24
10. Subroutine OUTPRO	III-26
11. Subroutine PAGSET	III-28
12. Subroutine PAGMGR	III-30
13. Subroutine PROFIL	III-32
14. Subroutine PROSET	III-36
15. Subroutine SBOPEN	III-38
16. Subroutine SBREAD	III-40
17. Subroutine TOTSET	III-42
18. Subroutine TOTUP	III-44
19. Subroutine TOTOUT	III-47

TABLE OF CONTENTS (continued)

<u>SECTION</u>		<u>PAGE</u>
IV.	SUMMARY.	IV-1
	APPENDICES	
A.	COMMON CROSS REFERENCE.	A-1
B.	SUBROUTINE CROSS REFERENCE	B-1
C.	SUBSET BINARY FILE DESCRIPTION (Mass Storage Input).	C-1
L.	AESD/RSVP FILE DESCRIPTION (Mass Storage Output)	D-1
E.	USER JOB SET-UP	E-1

LIST OF FIGURES

<u>FIGURE</u>		<u>PAGE</u>
II-1	SYSTEM DATA FLOW AND PROGRAM INTERFACES	II-2
II-2	MASTER RECORD FORMAT	II-3
II-3	CONVRT GENERAL PROCESS FLOW	II-4
II-4	CONVRT GENERAL PROCESS FLOW	II-5
II-5	CREATABASE GENERATION OF AN SBF	II-8
II-6	CONVRT CARD INPUT FORMAT	II-9
II-7	SAMPLE OUTPUT (TAPE 6) FOR A SUCCESSFUL RUN	II-11
II-8	POSSIBLE ERROR MESSAGES	II-12
III-1	CONVRT PROGRAM STRUCTURE AND ORGANIZATION	III-3

Prepared for
Naval Ocean Research and Development Activity
NSTL Station, Mississippi

Prepared under
Contract No. N00014-77-C-0165

SOFTWARE DESIGN, CONFIGURATION
AND DOCUMENTATION REVIEW

(DRAFT)

Technical Task Report

August 15, 1980

Prepared by:
Dr. R. L. Hall
OCEAN DATA SYSTEMS, INC.
ROCKVILLE, MARYLAND 20852

FOREWORD

This document is a Technical Task Report prepared under Contract Number N00014-77-0165 for the Naval Ocean Research and Development Activity (NORDA), NSTL Station, Mississippi. It presents a review of operational software associated with the past and current activities sponsored by the Modeling Program of the Surveillance Environmental Acoustic Support (SEAS) Project. The review focuses on that software which is involved in the SEAS Data Management system and which is used in the data banking, environmental data processing and user services activities. Specifically, this work was performed for NORDA Code 520, SEAS Project.

Ocean Data Systems is indebted to LCDR Kirk Evans, Manager, SEAS Modeling Program, NORDA Code 520 for furnishing an environment conducive to completion of this task.

ABSTRACT

The Software Configuration and Documentation Review provides the SEAS Data Management System planners with an overview of the existing software capabilities and the status of available program documentation. Each computer program in the network of data management software and some of the acoustic models which interface with that software are identified. Summary program descriptions are included which discuss the program interrelationships as well as the operational program status and availability of appropriate technical and user documentation. A narrative description is provided for the data flow as it operated during FY-79 and as it was planned for improvement during FY-80. A brief status of FY-80 improvement tasks is given and some of the FY-81 planned objectives are discussed.

TABLE OF CONTENTS

<u>SECTION</u>		<u>PAGE</u>
	FOREWORD	i
	ABSTRACT	ii
	TABLE OF CONTENTS	iii
	LIST OF FIGURES	iv
1.0	INTRODUCTION	1-1
1.1	Background	1-1
1.2	Scope	1-2
1.3	Objectives	1-2
1.4	References.	1-3
2.0	CONFIGURATION REVIEW AND PRELIMINARY DATA FLOW DESIGN	2-1
2.1	General Approach.	2-1
2.2	Documentation Review	2-1
2.3	Preliminary Data Flow Design	2-3
2.3.1	Existing Data Flow	2-5
2.3.2	Planned Data Flow Improvements	2-6
2.4	Status of FY-80 Improvements	2-8
2.5	FY-81 Planning	2-14
3.0	SUMMARY AND RECOMMENDATIONS	3-1
3.1	Summary	3-1
3.2	Recommendations.	3-1
APPENDIX A:	SOFTWARE SUMMARY	
B:	LIST OF DATA BASES	

LIST OF FIGURES

<u>FIGURE</u>		<u>PAGE</u>
2-1	SEAS PRELIMINARY ENVIRONMENTAL DATA AND TRANSMISSION LOSS PROCESSING FLOW	2-2
2-2	SEAS ENVIRONMENTAL DATA FLOW, EXISTING AND PLANNED (FY-80)	2-4
2-3	SEAS ENVIRONMENTAL DATA FLOW, FISCAL YEAR 1980 PROGRESS	2-9
2-4	CREATABASE/CONVRT/RSVP DATA FLOW	2-11
2-5	CREATABASE/EGO DATA FLOW	2-12
2-6	SYNBAPS/AUTO-OCEAN ACOUSTIC MODEL INTERFACE DATA FLOW	2-13



OCEAN DATA SYSTEMS, INC.

6000 EXECUTIVE BLVD., ROCKVILLE, MARYLAND 20852 • 301/881-3031

Prepared for

Naval Ocean Research and Development Activity
NSTL Station, Mississippi

Prepared Under

Contract No. N00014-77-C-0165
ODSI Project No. 1003

NORDA ACOUSTIC MODEL
OPERATING SYSTEM
(NAMOS)

Version 1.0

User's Primer

June 30, 1981

Prepared by

Arnold L. Bochner
Jacqueline Webster

Ocean Data Systems, Inc.
Rockville, Maryland

FOREWORD

This document is a technical task report for the FY-80 Model Operating System Development and Installation Task completed under Contract Number N00014-77-C-0165 for the Naval Ocean Research and Development Activity (NORDA), NSTL Station, Mississippi. It serves as a guide for new users of the NORDA Acoustic Model Operating System (NAMOS) Version 1.0 which was developed by Ocean Data Systems, Inc. (ODSI) and installed at NORDA on 6 February 1981. Specific contract technical direction was provided by NORDA Code 520, the Surveillance Environmental Acoustic Support (SEAS) Project and by NORDA Code 320, the Numerical Modeling Division.

ODSI acknowledges Mr. John Cornyn, formerly of NORDA Code 320, for his technical management support in the formulation of concepts used in NAMOS. Dr. Edward Moses, ORI Inc., is also acknowledged for his substantial contributions in the acoustic modeling design inherent in NAMOS.

Mr. Michael Ohlendorf and Ms. Susan Payne, Applied Research Laboratory, University of Texas at Austin, played an important role in the preliminary and critical design reviews. Their contributions during these decisive stages of development were valuable in helping NAMOS Version 1.0 achieve the established performance goals.

Finally, it is a pleasure to acknowledge the sponsor whose support has made NAMOS a reality. We are indebted to CDR Kirk Evans, SEAS Acoustic Modeling Program Manager, for his enthusiastic sponsorship of this work.

ABSTRACT

The NORDA Acoustic Model Operating System (NAMOS) is a computer software system designed to predict environmental factors that affect the performance of underwater acoustic sensors and to estimate resulting sensor system performance. NAMOS draws together existing modeling capabilities into a cohesive and modular entity, and provides a framework for the systematic evolution of those capabilities. It constitutes a significant upgrade of NORDA 320's ability to model the ocean environment and the performance of sonar systems operating in this environment. It is responsive to NORDA 320's operating requirements and is designed to facilitate the conduct of research and development, and studies requiring the production of sonar system performance estimates.

NAMOS consists of a set of acoustic modeling application software with supporting data bases, and interactive executive system software to interface with the user at a remote conversational terminal. It allows an on-line user to build, submit for processing, save, and edit acoustic modeling jobs.

This document is a primer to introduce a new user to Version 1.0 of NAMOS. It provides him with basic information about how the system operates and how he can interact with it to use the NORDA acoustic models. The report presents all the interactive dialogue and a sample session using NAMOS. As well, the document includes a brief explanation of the structure of the system and diagrams relating the system modules to the dialogue.

This document has been prepared with NORDA 320 usage in mind, and thus the details contained herein concern the software and file implementation on NORDA 320's main computer resource, Control Data Corporation (CDC) 6000 Series computers under control of the Network Operating System/Batch Environment (NOS/BE).

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
FOREWORD	i
ABSTRACT	ii
TABLE OF CONTENTS	iii
LIST OF FIGURES	v
1.0 INTRODUCTION	1-1
1.1 Background	1-1
1.2 Project References	1-2
1.3 Terminology	1-2
1.4 System Overview	1-3
1.5 User Interaction	1-4
2.0 NAMOS DIALOGUES	2-1
2.1 Dialogue Standards	2-1
2.2 EXECUTIVE Dialogues	2-2
2.2.1 HELP	2-2
2.2.2 CREATE	2-3
2.2.3 SAVE	2-4
2.2.4 DISPATCH	2-5
2.2.5 GET	2-8
2.2.6 PURGE	2-9
2.2.7 EXIT	2-10
2.3 EDIT Dialogues	2-11
2.3.1 H -- HELP	2-12
2.3.2 L -- LIST SUMMARY OF CONTROL TABLE	2-13
2.3.3 L, n -- LIST TASK NO. n	2-14
2.3.4 O -- DISPLAY OPTIONS	2-15
2.3.5 P -- ENTER INPUT PARAMETERS	2-16
2.3.6 P, n -- ENTER INPUT PARAMETERS FOR TASK NO. n	2-17
2.3.7 G, n, m -- GENERATE INPUT DATA SET FOR TASK NO. n	2-18
2.3.8 U, n, m -- USE OUTPUT DATA SET M FROM TASK n	2-19
2.3.9 A, n -- ADD A TASK AFTER TASK NO. n	2-20
2.3.10 R, n -- REPLACE TASK NO. n	2-21
2.3.11 D, n -- DELETE TASK NO. n	2-22
2.3.12 X -- EXIT FROM EDIT	2-23

TABLE OF CONTENTS
(continued)

<u>SECTION</u>	<u>PAGE</u>
2.4 User Input Parameter Dialogues	2-24
2.4.1 ASTRAL Dialogue	2-25
2.4.2 AUTOCEAN Dialogue	2-28
2.4.3 CNOISE Dialogue	2-31
2.4.4 SIAMAD Dialogue	2-34
2.4.5 SIAMPR Dialogue	2-37
2.4.6 SIAMTL Dialogue	2-43
2.4.7 AUTOFACE Dialogue	2-46
APPENDIX A -- DIALOGUE/ACTION FLOWS.	A-1
APPENDIX B -- DIALOGUE EXAMPLES . . .	B-1
APPENDIX C -- DISTRIBUTION LIST	C-1

LIST OF FIGURES

<u>FIGURE</u>		<u>PAGE</u>
1-1	USER/NAMOS INTERACTION	1-6

odsi OCEAN DATA SYSTEMS, INC.
6000 EXECUTIVE BLVD., ROCKVILLE, MARYLAND 20852 • 301/881-3031

Prepared for
Naval Ocean Research and Development Activity
NSTL Station, Mississippi

Prepared under
Contract No. N00014-77-C-0165
ODSI Project No. 1003

NORDA ACOUSTIC MODEL
OPERATING SYSTEM
(NAMOS)

Version 1.0
System Summary
FY-80
Technical Task Report

June 30, 1981

Prepared by
John H. Locklin
Jacqueline Webster
Ocean Data Systems, Inc.
Rockville, Maryland

FOREWORD

This document is a final technical task report for the FY-80 Model Operating System Development and Installation Task completed under Contract Number N00014-77-C-0165 for the Naval Ocean Research and Development Activity (NORDA), NSTL Station, Mississippi. It is an overview of the NORDA Acoustic Model Operating System (NAMOS) Version 1.0 which was developed by Ocean Data Systems, Inc. (ODSI) and installed at NORDA on 6 February 1981. Specific contract technical direction was provided by NORDA Code 520, the Surveillance Environmental Acoustic Support (SEAS) Project and by NORDA Code 320, the Numerical Modeling Division.

ODSI acknowledges Mr. John Cornyn, formerly of NORDA Code 320, for his technical management support in the formulation of concepts used in NAMOS. Dr. Edward Moses, ORI Inc., is also acknowledged for his substantial contributions in the acoustic modeling design inherent in NAMOS.

Mr. Michael Ohlendorf and Ms. Susan Payne, Applied Research Laboratory, University of Texas at Austin, played an important role in the preliminary and critical design reviews. Their contributions during these decisive stages of development were valuable in helping NAMOS Version 1.0 achieve the established performance goals.

Finally, it is a pleasure to acknowledge the sponsor whose support has made NAMOS a reality. We are indebted to CDR Kirk Evans, SEAS Acoustic Modeling Program Manager, for his enthusiastic sponsorship of this work.

ABSTRACT

The NORDA Acoustic Model Operating System (NAMOS) is a computer software system designed to predict environmental factors that affect the performance of underwater acoustic sensors and to estimate resulting sensor system performance. NAMOS draws together existing modeling capabilities into a cohesive and modular entity, and provides a framework for the systematic evolution of those capabilities. It constitutes a significant upgrade of NORDA 320's ability to model the ocean environment and the performance of sonar systems operating in this environment. It is responsive to NORDA 320's operating requirements and is designed to facilitate the conduct of research and development, and studies requiring the production of sonar system performance estimates.

NAMOS consists of a set of acoustic modeling application software with supporting data bases, and interactive executive system software to interface with the user at a remote conversational terminal. The application software in Version 1.0 is the collection of computer programs that perform the data base extraction, transmission loss, and ambient noise functions. The NAMOS executive software allows an on-line user to build, submit for processing, save, and edit acoustic modeling jobs. NAMOS system development has involved both new and existing software. The modeling applications used in NAMOS Version 1.0 were taken directly from the existing suite of NORDA 320 programs and data bases. The NAMOS executive with its interactive modules constitutes the major development of new software.

This document, the NAMOS Version 1.0 System Summary, provides a general description of the system components that were implemented in Version 1.0. The NAMOS Functional Description provided the overall system architecture and established the design objectives and principles used in the development of Version 1.0. This document relates Version 1.0 to the comprehensive NAMOS architecture presented in the Functional Description and provides an overview of the current capability. It has been prepared with NORDA 320 use in mind, and thus, the details contained herein concern the software and file implementation

on NORDA 320's main computer resource, the Control Data Corporation 6000 Series computers under control of the Network Operating System/Batch Environment (NOS/BE).

TABLE OF CONTENTS

<u>SECTION</u>		<u>PAGE</u>
	FOREWORD	i
	ABSTRACT	ii
	TABLE OF CONTENTS	iv
	LIST OF FIGURES	v
1.0	INTRODUCTION	1-1
	1.1 Background	1-1
	1.2 Scope	1-2
	1.3 Objectives	1-3
	1.4 Project References	1-4
2.0	NAMOS SYSTEM DESCRIPTION	2-1
	2.1 Overview	2-1
	2.2 Application Software	2-1
	2.3 Executive System Software	2-6
	2.3.1 User Input Processors	2-8
	2.3.2 Control Software	2-8
3.0	VERSION 1.0 ACOUSTIC APPLICATION SOFTWARE	3-1
4.0	VERSION 1.0 EXECUTIVE SYSTEM SOFTWARE . .	4-1
	4.1 System Tables for Version 1.0	4-1
	4.1.1 Dialogue Text	4-1
	4.1.2 Inventories	4-3
	4.1.3 Job Control Tables	4-4
	4.2 System Files for Version 1.0	4-4
	4.3 User Input Processors for Version 1.0	4-5
	4.4 Control Software for Version 1.0	4-6
5.0	FUTURE DEVELOPMENT	5-1
 <u>APPENDIX</u>		
A	DISTRIBUTION LIST	A-1

LIST OF FIGURES

<u>FIGURE</u>		<u>PAGE</u>
2-1	NAMOS OVERVIEW	2-2
2-2	ACOUSTIC MODELING FUNCTIONS	2-3
2-3	ACOUSTIC APPLICATION PROCESS FLOW . . .	2-5
2-4	NAMOS SYSTEM SOFTWARE ORGANIZATION . .	2-7
3-1	ACOUSTIC MODELING DATA FLOW FOR NAMOS VERSION 1.0	3-2
3-2	VERSION 1.0 OE-TL PROCESSING	3-3
3-3	VERSION 1.0 N-AN PROCESSING	3-4
4-1	USER/NAMOS INTERACTION	4-2



OCEAN DATA SYSTEMS, INC.

6000 EXECUTIVE BLVD., ROCKVILLE, MARYLAND 20852 • 301/881-3031

Prepared for

Naval Ocean Research and Development Activity
NSTL Station, Mississippi

Prepared under

Contract N00014-77-C-0165
ODSI Project No. 1003

NORDA ACOUSTIC MODEL
OPERATING SYSTEM
(NAMOS)

Version 1.0

Programmer's Reference Manual

July 31, 1981

Prepared by

Jacqueline Webster

Ocean Data Systems, Inc.
Rockville, Maryland

FOREWORD

This document is a part of the FY-81 Model Operating System Documentation Task completed under Contract Number N00014-77-C-0165 for the Naval Ocean Research and Development Activity (NORDA), NSTL Station, Mississippi. It is a programmer's reference manual for the NORDA Acoustic Model Operating System (NAMOS) Version 1.0 which was developed by Ocean Data Systems, Inc. (ODSI) and installed at NORDA on 6 February 1981. Specific contract technical direction was provided by NORDA Code 520, the Surveillance Environmental Acoustic Support (SEAS) Project and by NORDA Code 320, the Numerical Modeling Division.

ODSI acknowledges Mr. John Cornyn, formerly of NORDA Code 320, for his technical management support in the formulation of concepts used in NAMOS. Dr. Edward Moses, ORI Inc., is also acknowledged for his substantial contributions in the acoustic modeling design inherent in NAMOS.

Mr. Michael Ohlendorf and Ms. Susan Payne, Applied Research Laboratory, University of Texas at Austin, played an important role in the preliminary and critical design reviews. Their contributions during these decisive stages of development were valuable in helping NAMOS Version 1.0 achieve the established performance goals.

Finally, it is a pleasure to acknowledge the sponsor whose support has made NAMOS a reality. We are indebted to CDR Kirk Evans, SEAS Acoustic Modeling Program Manager, for his enthusiastic sponsorship of this work.

FOREWORD

This document is a part of the FY-81 Model Operating System Documentation Task completed under Contract Number N00014-77-C-0165 for the Naval Ocean Research and Development Activity (NORDA), NSTL Station, Mississippi. It is a programmer's reference manual for the NORDA Acoustic Model Operating System (NAMOS) Version 1.0 which was developed by Ocean Data Systems, Inc. (ODSI) and installed at NORDA on 6 February 1981. Specific contract technical direction was provided by NORDA Code 520, the Surveillance Environmental Acoustic Support (SEAS) Project and by NORDA Code 320, the Numerical Modeling Division.

ODSI acknowledges Mr. John Cornyn, formerly of NORDA Code 320, for his technical management support in the formulation of concepts used in NAMOS. Dr. Edward Moses, ORI Inc., is also acknowledged for his substantial contributions in the acoustic modeling design inherent in NAMOS.

Mr. Michael Ohlendorf and Ms. Susan Payne, Applied Research Laboratory, University of Texas at Austin, played an important role in the preliminary and critical design reviews. Their contributions during these decisive stages of development were valuable in helping NAMOS Version 1.0 achieve the established performance goals.

Finally, it is a pleasure to acknowledge the sponsor whose support has made NAMOS a reality. We are indebted to CDR Kirk Evans, SEAS Acoustic Modeling Program Manager, for his enthusiastic sponsorship of this work.

ABSTRACT

The NORDA Acoustic Model Operating System (NAMOS) is a computer software system designed to predict environmental factors that affect the performance of underwater acoustic sensors and to estimate resulting sensor system performance. NAMOS draws together existing modeling capabilities into a cohesive and modular entity, and provides a framework for the systematic evolution of those capabilities. It constitutes a significant upgrade of NORDA 320's ability to model the ocean environment and the performance of sonar systems operating in this environment. It is responsive to NORDA 320's operating requirements and is designed to facilitate the conduct of research and development, and studies requiring the production of sonar system performance estimates.

NAMOS consists of a set of acoustic modeling application software with supporting data bases, and interactive executive system software to interface with the user at a remote conversational terminal. The application software in Version 1.0 is the collection of computer programs that perform the environmental data base extraction, transmission loss, and ambient noise functions. The NAMOS executive software allows an on-line user to build, submit for processing, save, and edit acoustic modeling jobs. NAMOS has been implemented on NORDA 320's main computer resource, the Control Data Corporation (CDC) 6000 Series computers under control of the Network Operating System/Batch Environment (NOS/BE).

This document describes Version 1.0 of the NAMOS system from a programmer's point of view. It delineates those parts of the system that a programmer needs to understand in order to maintain and improve the system. It includes a description of the system data files. As well, it contains structure diagrams of the system and a brief description of each program in the system. It also includes a list of error messages, a discussion on CDC system dependencies, and a section outlining maintenance procedures to be followed when making changes to the system.

TABLE OF CONTENTS

<u>SECTION</u>		<u>PAGE</u>
	FOREWORD	i
	ABSTRACT	ii
	TABLE OF CONTENTS	iii
	LIST OF FIGURES	iv
	LIST OF TABLES	v
1.0	INTRODUCTION	1-1
	1.1 Objectives	1-1
	1.2 Project References	1-2
2.0	SYSTEM DESCRIPTION	2-1
	2.1 Overview	2-1
	2.2 Data Structures.	2-3
	2.2.1 Introduction	2-3
	2.2.2 System Configuration Inventories	2-5
	2.2.2.1 Function Inventory	2-5
	2.2.2.2 Task Inventory	2-7
	2.2.2.3 Program Inventory	2-9
	2.2.2.4 Data Inventory	2-12
	2.2.3 Job Control Tables	2-16
	2.2.3.1 System Resources Table	2-16
	2.2.3.2 Coarse Control Table	2-16
	2.2.3.3 File Control Table	2-18
	2.2.3.4 Acoustic Parameters Table	2-19
	2.2.4 Dialogue Text Tables	2-20
	2.3 Executive System Software.	2-21
	2.3.1 System Structure	2-28
	2.3.2 Control Software	2-28
	2.3.3 User Input Processors	2-29
	2.3.3.1 Implementation Method	2-30
	2.3.3.2 Standard Call.	2-31
	2.3.3.3 Standard Arrays	2-32
	2.3.3.4 Pseudo-code Template	2-33
	2.3.3.5 Utility Subroutines	2-35
3.0	SYSTEM DATA FILES	3-1
	3.1 Input Files	3-1
	3.1.1 Dialogue Text File	3-1
	3.1.2 System Configuration Inventories	3-2
	3.1.2.1 Binary Inventories.	3-3
	3.1.2.2 Card Image Inventories	3-4

TABLE OF CONTENTS (continued)

<u>SECTION</u>		<u>PAGE</u>
	3.2 Output Files	3-7
	3.2.1 Job Control File	3-7
	3.2.2 Job Submittal File	3-10
	3.3 System Work Files	3-12
	3.3.1 Input Parameter File	3-12
	3.3.2 User Input Parameter File	3-12
	3.3.3 Scratch	3-14
4.0	MAINTENANCE PROCEDURES	4-1
	4.1 NAMOS Permanent Files	4-1
	4.1.1 Source Files	4-1
	4.1.2 System Input Files	4-1
	4.1.3 CCL Procedure File	4-2
	4.1.4 NAMOS Execution File	4-2
	4.1.5 Relocatable Libraries	4-2
	4.2 Adding Acoustic Capability	4-3
	4.2.1 Adding an Acoustic Function	4-3
	4.2.2 Adding a Task	4-3
	4.2.2.1 Updating the Inventories	4-3
	4.2.2.2 Implementing New User Input Processors	4-4
	4.2.2.3 Updating NAMOS Control Software	4-4
	4.3 Modifying NAMOS System Software	4-5
	4.4 Installation Dependencies	4-5
5.0	INPUT PARAMETERS FOR ACOUSTIC APPLICATION PROGRAMS	5-1
6.0	ERROR MESSAGES	6-1
	6.1 User Entry Errors	6-1
	6.2 General User Errors	6-5
	6.3 NAMOS Software Errors	6-8
7.0	INDIVIDUAL PROGRAM DESCRIPTIONS	7-1
	7.1 COMMON Description	7-2
	7.2 NAMOS Executive Control	7-13
	7.3 User Input Processors	7-137
<u>APPENDIX</u>		
A	DISTRIBUTION LIST	A-1

LIST OF FIGURES

<u>FIGURE</u>		<u>PAGE</u>
2-1	NAMOS SYSTEM ORGANIZATION	2-2
2-2	NAMOS STRUCTURE DIAGRAM	2-23

LIST OF TABLES

<u>TABLE</u>		<u>PAGE</u>
5-1	CONVERSION CODES FOR UIP ALGORITHMS . . .	5-3
5-2	RULES FOR ASTRAL UIP	5-4
5-3	RULES FOR AUTOOCEAN UIP	5-6
5-4	RULES FOR CNOISE UIP	5-7
5-5	RULES FOR SIAMAD UIP	5-8
5-6	RULES FOR SIAMPR UIP	5-9
5-7	RULES FOR SIAMTL UIP	5-11



OCEAN DATA SYSTEMS, INC.

6000 EXECUTIVE BLVD., ROCKVILLE, MARYLAND 20852 • 301/881-3031

Prepared for

Naval Ocean Research and Development Activity
NSTL Station, Mississippi

Prepared under

Contract No. N00014-77-C-0165
ODSI Project No. 1003

NORD A ACOUSTIC MODEL
OPERATING SYSTEM
(NAMOS)

Upgrade of NAMOS to Version 2.0

Final Technical Task Report

November 30, 1981

Prepared by

Marie Johnson
John Schumacher
Jacqueline Webster

Ocean Data Systems, Inc.
Rockville, Maryland

FOREWORD

This document is the final technical task report for the NAMOS System Maintenance and Upgrade tasks completed under Contract Number N00014-77-C-0165 for the Naval Ocean Research and Development Activity (NORDA), NSTL Station, Mississippi. It describes the work performed by Ocean Data Systems, Inc. (ODSI) in upgrading the NORDA Acoustic Model Operating System (NAMOS) from Version 1.0 to Version 2.0, which was installed at NORDA in October 1981. Specific contract technical direction was provided by NORDA Code 520, the Surveillance Environmental Acoustic Support (SEAS) Project and by NORDA Code 320, the Numerical Modeling Division.

Ocean Data Systems, Inc., is indebted to CDR Kirk Evans, formerly of NORDA Code 520, and to CDR Michael McCallister of NORDA Code 520 for sponsoring this task. ODSI also thanks Dr. David King of NORDA Code 320 for his technical management support, and for his work in identifying modifications that contributed to the increased user-friendliness of NAMOS Version 2.0.

ABSTRACT

The NORDA Acoustic Model Operating System (NAMOS) is a computer software system designed to predict environmental factors that affect the performance of underwater acoustic sensors and to estimate resulting sensor system performance. NAMOS draws together existing modeling capabilities into a cohesive and modular entity, and provides a framework for the systematic evolution of those capabilities. It constitutes a significant upgrade of NORDA 320's ability to model the ocean environment and the performance of sonar systems operating in this environment. It is responsive to NORDA 320's operating requirements and is designed to facilitate the conduct of research and development, and studies requiring the production of sonar system performance estimates.

NAMOS consists of a set of acoustic modeling application software with supporting data bases, and interactive executive system software to interface with the user at a remote conversational terminal. The application software is the collection of computer programs that perform the environmental data base extraction, transmission loss, and ambient noise functions. The NAMOS executive software allows an on-line user to build, submit for processing, save, and edit acoustic modeling jobs. NAMOS has been implemented on NORDA 320's main computer resource, the Control Data Corporation (CDC) CYBER 170 Series computers under control of the Network Operating System/Batch Environment (NOS/BE).

This Technical Task Report provides a description of the modifications made to NAMOS in upgrading the system from Version 1.0 to Version 2.0. The changes described herein are also incorporated into relevant sections of the NAMOS Version 2.0 User's Guide and Programmer's Reference Manual which are in preparation.

TABLE OF CONTENTS

<u>SECTION</u>		<u>PAGE</u>
	FOREWORD	i
	ABSTRACT	ii
	TABLE OF CONTENTS	iii
	LIST OF FIGURES	iv
1.0	INTRODUCTION	1-1
	1.1 Background	1-2
	1.2 Scope	1-3
	1.3 Objectives	1-3
	1.4 Project References	1-4
2.0	MAINTENANCE	2-1
3.0	ADDITION OF NEWPE TRANSMISSION LOSS METHOD	3-1
	3.1 User Input Processors	3-1
	3.1.1 NEWPE	3-1
	3.1.2 ASTRAL	3-2
	3.2 Modifications to Acoustic Applications Programs	3-2
	3.3 Modifications to NAMOS Executive Control	3-5
	3.4 Modifications to CCL Procedures	3-6
4.0	EXECUTIVE SYSTEM IMPROVEMENTS	4-1
	4.1 Active Dispatch Module	4-1
	4.2 Default File Identifiers	4-1
	4.3 Improvements to the User Input Processors	4-1
	4.4 Check of Y/N Responses	4-3
	4.5 Names for Noise Source Function	4-3
	4.6 User Conveniences	4-3
	4.6.1 Password Option	4-3
	4.6.2 Display of Tasks	4-3
	4.6.3 Default Output Terminal ID	4-6
	4.7 Source Code Readability	4-6
 <u>APPENDIX</u>		
A.	NEWPE SPECIFICATIONS	A-1
	A-1 NEWPE Dialogue	A-1
	A-2 Rules for NEWPE User Input Processor	A-14
B.	DISTRIBUTION LIST	B-1

LIST OF FIGURES

<u>FIGURE</u>		<u>PAGE</u>
3-1	NEWPE SAMPLE DIALOGUE	3-3
4-1	SAMPLE OF ACTIVE DISPATCH AND DEFAULT FILE IDENTIFIERS	4-2
4-2	SAMPLE SECTOR GEOMETRY SPECIFICATION . .	4-4
4-3	USE OF PASSWORD OPTION	4-5

Submitted To:
OFFICE OF NAVAL RESEARCH
WASHINGTON, D.C.

FACT-9H
VERSION DESCRIPTION DOCUMENT

January 1, 1982

Prepared Under:

Contracts: N00014-77-C-0165
N00014-78-C-0833
N00014-78-C-0819

Prepared By:

G. Jacobs
OCEAN DATA SYSTEMS, INC.
ROCKVILLE, MARYLAND 20852

FOREWORD

This report was prepared under Office of Naval Research (ONR) Contracts N00014-77-C-0165, N00014-78-C-0833, and N00014-78-C-0819 for the Naval Ocean Research and Development Activity (NORDA) -- Codes 320, 520 and 530, NSTL Station, Mississippi. It is meant to serve as documentation of the effort to upgrade the Fast Asymptotic Coherent Transmission (FACT) loss program from version 9D to 9H and as a manual for the implementation and use of 9H.

Ocean Data Systems, Inc. is indebted to CDR M. McCallister, Mr. C. Wilcox and their staffs at NORDA for furnishing the environment conducive to the successful realization of the objectives of this contract. Appreciation is also extended to Mr. R. Lauer, NORDA 323, for providing much of the technical guidance required in this effort. Special thanks is directed to Mr. J. Cornyn, formerly of NORDA 321, who provided overall direction in the preparation of FACT-9H and who suggested much of the form and content of this document, critiqued it in its various stages of preparation, and was responsible for collecting, collating and reformatting most of the information contained in Section VIII and the various appendices.

ABSTRACT

The first version of the Fast Asymptotic Coherent Transmission (FACT) model, developed in 1973 and designated FACT-9B, was updated to 9D in 1975. This report documents the 9H updates, the first FACT updates to be issued since the promulgation of FACT-9D.

In addition to a general description of the FACT-9H updates, this document contains instructions for the implementation and use of 9H, sample input and output, corrections for errors in previous FACT documentation, and plans for future FACT development.

TABLE OF CONTENTS

<u>CHAPTER</u>		<u>PAGE</u>
	FOREWORD	i
	ABSTRACT	ii
I.	INTRODUCTION	I-1
II.	UPDATE DESCRIPTIONS	II-1
III.	INPUT.	III-1
	1. Card Input	III-1
	1. Detailed Description	III-1
	2. Quick-Look Description.	III-11
	3. Sample Input	III-14
	2. Mass Storage Input.	III-18
IV.	OUTPUT.	IV-1
	1. Line Printer Output	IV-1
	2. Mass Storage Output	IV-21
	1. Transmission Loss File	IV-21
	2. Arrival Angle File	IV-22
V.	NEW ROUTINES	V-1
	1. ABRIT	V-2
	2. BTMLOS	V-4
	3. PRNTBL	V-11
	4. USERBL	V-14
VI.	SYSTEM DEPENDENT FEATURES	VI-1
VII.	CAVEATS AND SUGGESTIONS	VII-1
VIII.	DOCUMENTATION ERRORS AND CORRECTIONS .	VIII-1
	1. Errors in Volume I	VIII-2
	2. Errors in Volume II.	VIII-3
IX.	FUTURE PLANS	IX-1
 <u>APPENDICES</u>		
A	ROUTINE CROSS REFERENCE.	A-1
B	COMMON CROSS REFERENCE.	B-1
C	DEBUG OUTPUT DESCRIPTION	C-1
D	AVAILABLE FACT PRODUCTS.	D-1



OCEAN DATA SYSTEMS, INC.
6000 EXECUTIVE BLVD., ROCKVILLE, MARYLAND 20852 • 301/881-3031

Prepared for

Naval Ocean Research and Development Activity
NSTL Station, Mississippi

Prepared Under

Contract No. N00014-77-C-0165
ODSI Project No. 1003

NORDA ACOUSTIC MODEL
OPERATING SYSTEM
(NAMOS)

Version 2.3

User's Primer

February 8, 1982

Prepared by

Arnold L. Bochner
Jacqueline Webster
Marie Johnson

Ocean Data Systems, Inc.
Rockville, Maryland

FOREWORD

This document is a technical task report for the FY-81 Model Operating System Maintenance and Upgrade Task completed under Contract Number N00014-77-C-0165 for the Naval Ocean Research and Development Activity (NORDA), NSTL Station, Mississippi. It serves as a guide for new users of the NORDA Acoustic Model Operating System (NAMOS) Version 2.3 which was developed by Ocean Data Systems, Inc. (ODSI) and installed at NORDA in February 1982. Specific contract technical direction was provided by NORDA Code 520, the Surveillance Environmental Acoustic Support (SEAS) Project and by NORDA Code 320, the Numerical Modeling Division.

ODSI acknowledges Mr. John Cornyn, formerly of NORDA Code 320, for his technical management support in the formulation of concepts used in NAMOS. ODSI also thanks Dr. David King of NORDA Code 320 for his work in the identification of modifications that contribute to the increased user-friendliness of NAMOS, and for his help in the design of dialogue for the transmission loss module that was added in Version 2.0.

Mr. Michael Ohlendorf and Ms. Susan Payne, Applied Research Laboratory, University of Texas at Austin, played an important role in the preliminary and critical design reviews. Their contributions during these decisive stages of development were valuable in helping NAMOS achieve the established performance goals. Dr. Edward Moses, ORI Inc., is also acknowledged for his substantial contributions in the acoustic modeling design inherent in NAMOS.

Finally, it is a pleasure to acknowledge the sponsors whose support has made NAMOS a reality. We are indebted to CDR Kirk Evans formerly of NORDA Code 520, and to CDR Michael McCallister, NORDA Code 520 for their enthusiastic sponsorship of this work.

ABSTRACT

The NORDA Acoustic Model Operating System (NAMOS) is a computer software system designed to predict environmental factors that affect the performance of underwater acoustic sensors and to estimate resulting sensor system performance. NAMOS draws together existing modeling capabilities into a cohesive and modular entity, and provides a framework for the systematic evolution of those capabilities. It constitutes a significant upgrade of NORDA 320's ability to model the ocean environment and the performance of sonar systems operating in this environment. It is responsive to NORDA 320's operating requirements and is designed to facilitate the conduct of research and development, and studies requiring the production of sonar system performance estimates.

NAMOS consists of a set of acoustic modeling application software with supporting data bases, and interactive executive system software to interface with the user at a remote conversational terminal. It allows an on-line user to build, submit for processing, save, and edit acoustic modeling jobs.

This document is a primer to introduce a new user to Version 2.3 of NAMOS. It provides him with basic information about how the system operates and how he can interact with it to use the NORDA acoustic models. The report presents all the interactive dialogue and a sample session using NAMOS. As well, the document includes a brief explanation of the structure of the system and diagrams relating the system modules to the dialogue.

This Technical Task Report has been prepared with NORDA 320 usage in mind, and thus the details contained herein concern the software and file implementation on NORDA 320's main computer resource, Control Data Corporation (CDC) 170 Series computers under control of the Network Operating System/Batch Environment (NOS/BE).

TABLE OF CONTENTS

<u>SECTION</u>		<u>PAGE</u>
	FOREWORD	i
	ABSTRACT	ii
	TABLE OF CONTENTS	iii
	LIST OF FIGURES	v
1.0	INTRODUCTION.	1-1
	1.1 Background	1-1
	1.2 Project References	1-2
	1.3 Terminology	1-2
	1.4 System Overview	1-3
	1.5 User Interaction	1-5
2.0	NAMOS DIALOGUES	2-1
	2.1 Dialogue Standards	2-1
	2.2 EXECUTIVE Dialogues.	2-2
	2.2.1 HELP	2-2
	2.2.2 CREATE.	2-3
	2.2.3 SAVE	2-4
	2.2.4 DISPATCH.	2-5
	2.2.5 GET.	2-9
	2.2.6 PURGE	2-10
	2.2.7 EXIT	2-11
	2.3 EDIT Dialogues	2-12
	2.3.1 H -- HELP	2-13
	2.3.2 L -- LIST SUMMARY OF CONTROL TABLE	2-14
	2.3.3 L, n -- LIST TASK NO. n.	2-15
	2.3.4 O -- DISPLAY OPTIONS.	2-16
	2.3.5 P -- ENTER INPUT PARAMETERS	2-17
	2.3.6 P, n -- ENTER INPUT PARAMETERS FOR TASK NO. n	2-18
	2.3.7 G, n, m -- GENERATE INPUT DATA SET FOR TASK NO. n	2-19
	2.3.8 U, n, m -- USE OUTPUT DATA SET M FROM TASK n	2-20
	2.3.9 A, n -- ADD A TASK AFTER TASK NO. n	2-21
	2.3.10 R, n -- REPLACE TASK NO. n	2-22
	2.3.11 D, n -- DELETE TASK NO. n	2-23
	2.3.12 X -- EXIT FROM EDIT	2-24

TABLE OF CONTENTS
(continued)

<u>SECTION</u>		<u>PAGE</u>
2.4	User Input Parameter Dialogues.	2-25
2.4.1	ASTRAL Dialogue.	2-26
2.4.2	AUTOCEAN Dialogue	2-30
2.4.3	CNOISE Dialogue	2-33
2.4.4	NEWPE Dialogue	2-36
2.4.5	SIAMAD Dialogue	2-48
2.4.6	SIAMPR Dialogue	2-51
2.4.7	SIAMTL Dialogue	2-57
2.4.8	AUTOFACE Dialogue	2-60
 <u>APPENDIX</u>		
A	DIALOGUE/ACTION FLOWS	A-1
B	DIALOGUE EXAMPLES	B-1
C	DISTRIBUTION LIST	C-1

LIST OF FIGURES

<u>FIGURE</u>		<u>PAGE</u>
1-1	USER/NAMOS INTERACTION	1-6

